

**Directed Appropriations to the University of Washington**  
**FY2000- FY2006 *Funding Bills, unless otherwise noted.***

**LANDSCAPE ECOLOGY RESEARCH PROGRAMS**

**FY2000**

Department of Agriculture, U.S. Forest Service (page 477 of House Report 106-479): "The conference agreement provides no funding in the research account for the University of Washington landscape ecology study; rather, funds for this activity have been provided in the State and Private Forestry appropriation to maintain this effort at the fiscal year 1999 level (\$300,000)"

**OBJECTIVES/ ACCOMPLISHMENTS**

**Landscape Management System (LMS) Development, Demonstration, and Outreach  
(FY 2000: \$285,000 from 3/1/00 to 2/28/02)**

**Final Report:** The Landscape Demo project involves both software and technical capability development, maintenance, support, and demonstration of the scientific basis and technological tools for landscape level management of forested lands. The project integrates a number of basic and applied research activities (growth, habitat and ecosystem function models, visualization systems, and spatial representations) into a systems analysis framework and supports the transfer of this technology to user groups. The specific goals and objectives included: (1) updating the LMS Program, (2) development of companion tools to allow management and monitoring plans to effectively use LMS, (3) testing and analysis of components of LMS, (4) teaching tools for LMS, (5) demonstration of LMS in test areas, and (6) application and demonstration of landscape management and the landscape management system.

**Expected Impact:** The intended use is for small forest landowners, consultants, and community coalitions who will otherwise not have access to technology that can demonstrate the impact of management treatments on future forest conditions including economic and ecological measures. It provides technology to bridge different perspectives while satisfying multiple objectives. It allows quick and easy comparisons across different management strategies on a consistent basis, characterizing forest structure in considerable detail and displayed in tables, graphs, maps, and visualizations. Small owners will be able to develop management plans that respond to regulations and their own personal objectives while doing a better job of maintaining their long-term economic viability. Community consortia will be able to develop management strategies that serve their multiple objectives based on a consistent framework of analysis.

Over 3,000 copies of LMS 2.x have been downloaded from the website  
(<http://lms.cfr.washington.edu>), with an additional 500 copies distributed via CD-ROM.

**The development of companion tools to allow management and monitoring plans to effectively use LMS has resulted in two tools: *Scope&Group* and *Toggle*.** The *Scope&Group* spreadsheet combines stand level information for each stand with summary information from the tree inventory and displays a series of graphs cross-referencing various site variables versus stand summary values to allow the evaluation of the landscape area. This spreadsheet can be used to better understand the kind of stands that exist in an area as well as allow the examination of missing types of stands that become critical when trying to balance management over the area (scoping process). This spreadsheet also includes the ability to group stands into similar conditions and then select a representative stand to represent the group of stands for a more complex analysis on large acreages.

The evaluation of alternatives and analysis of consequences are done using the *Toggle* spreadsheet. This tool can evaluate a large number of simulation runs and compare the effects of alternatives on the management objectives. The *Toggle* is typically loaded using the representative stands (taken from *Scope&Group*) for groups on the landscape. New LMS stand inventory portfolios are created containing multiple copies of the representative stands. Each copy of a representative stand has multiple silvicultural pathways developed. The simulation runs are completed, and the results are loaded into the *Toggle* spreadsheet, allowing the evaluation of multiple alternatives by allocating a proportion of each stand to one or more simulations. Excel versions of both *Scope&Group* and *Toggle* have been developed and are being used on large landscapes. The current versions of both tools have been made available through the LMS web site (<http://lms.cfr.washington.edu/lmsdecisiontools.html>). Several hundred copies of these tools were downloaded by users within the first several months.

**Teaching Tools for LMS:** A number of LMS training sessions have been developed and presented over the past year. These range from training for small landowners (in combination with the Rural Technology Initiative (RTI)), extension foresters and consultants (with RTI), Indian tribes (Yakima Nation), and employees of the USDA Forest Service and Bureau of Land Management. The training materials include a workbook that includes step-by-step instructions on how to use the software. These training materials are available to all users at the LMS training sessions. They can also be downloaded from the website.

**Demonstration of LMS in Test Areas:** The demonstration of LMS in a test area was completed by developing a preliminary management plan for the University of Washington, Pack Forest. These components of the planning process were completed using LMS, *Scope&Group*, and *Toggle*. The preliminary plan, including objectives, scoping, grouping, management alternatives, chosen alternative, expected outcomes, and monitoring, is available on the web at: <http://silvae.cfr.washington.edu/pack-plan/>.

**Application and Demonstration of Landscape Management and the Landscape Management System, Examples:** The application and demonstration of landscape management was accomplished by making a variety of presentations:

- Landscape Management System Seminar, Washington, DC, June 20, 2001, presented to Senate and House Resources committees and Western States congressional delegation, along with other forestry concerned representatives.
- Presented to CORRIM research team.
- Presented at First International Precision Forestry Symposium.
- LMS Training, March 2000, March 2001.

**Papers and Presentations** (on the landscape management approach and uses of the Landscape Management System and companion tools), **some examples:**

- “Landscape management approach to providing forest values” by Chad Oliver. University of Washington, Summit 2000 forestry conference, University of Washington College of Forest Resources, Olympia, WA. March 29 & 30, 2000.
- “Landscape Management and economic opportunities” by Chad Oliver. Wallowa Resources. Economic Development Council, Enterprise, OR. Invited presentation and field tour to professionals and members of public. April 7 & 8, 2000.

## **FY2002**

Department of Interior, State and Private Forestry (page 98 of House Report 107-103/ House Report 107-234): “The Committee recommends \$9,200,000 for the Pacific Northwest Assistance programs...This funding includes ...\$300,000 for the University of Washington landscape ecology program.”

## **FY2003**

Department of Interior, State and Private Forestry (page 1011 of House Report 108-10): “Univ. WA Landscape Management .....\$200,000.”

## **FY2006**

Department of Interior, State and Private Forestry (page 117 of House Report 109-188): “\$500,000 for the private landowner database in Washington.”

## **OBJECTIVES/ ACCOMPLISHMENTS**

**Landscape Management System Development (FY02&03: \$489,020 from 5/1/02 to 12/31/04; See page 1 for initial description of FY00-02 funding that began the LMS project)**

The Landscape Demonstration Project includes the development of the Landscape Management System (LMS), maintenance, support, and demonstration of the scientific basis and tools for landscape management of forestlands. In this period of continued funding, modifications to the software are incorporated to remedy limitations, stay current with commercial support software development, provide integration with other software, and provide user documentation. The comparative advantage LMS provides is that it links many powerful software tools while using the best available scientific relationships and easily provides multiple outputs with many displays. It can produce both economic and ecological outputs over time on a stand level or landscape scale, all based on tree list projections, so that it allows easy analysis of management alternatives to serve any number of objectives.

**Updates to LMS Program:** A series of releases were provided that incorporated enhancements and maintained compatibility with other software releases such as Windows XP, FVS variant files, and EnVision. About 3,000 downloads of the software have been logged.

**Extended Features:** Support for the FFE-FVS extension was added, allowing LMS to be used for fire risk assessment simulations. The LMS-FFE add-on now includes the FFE Configuration, Fire Scoping, and Risk Mapping tools. LMS Analyst is now distributed with LMS and installed if the user has a copy of ArcView installed to facilitate the creation of landscapes. A new spreadsheet-based economic analysis was developed (Economatic) which provides simplified economic assessment of alternative management strategies using LMS.

**Continued Improvement in Software-Companion Tools:** A tutorial was developed for the *Scope & Group* spreadsheet which is used to evaluate large landscapes. The *Toggle* spreadsheet, which allows the user to select from multiple silvicultural pathways, provides an assessment matrix for multiple objectives, allowing the operator to easily change treatments to favor a mix of objectives. An expanded *Toggle* was developed for the BLM to analyze 40 stand types (divided between two landscapes with 20 stand types in each landscape) and up to 50 silvicultural pathways. This tool was used successfully to rapidly analyze landscape alternatives for a variety of management objectives over time.

**Demonstration of LMS in Test Areas:** LMS was used in the Colville National Forest, Olympic National Forest, Salem District BLM, Eugene District BLM, WA DNR Olympic Experimental State Forest, Eglin Air Force Base, Yalc-Myers Forest, Satsop Forest, and Pack Forest.

**Carbon Sequestration, Certification, and Conservation Objectives:** Collaboration with CORRIM has produced carbon sequestration tables with optional equation forms for consistency with FORCARB. The carbon sequestration aspects were also expanded with the development of a carbon life cycle analysis tool covering long lived products, energy displacement, and product substitution impacts.

**Technical Support and Collaboration:** LMS training sessions were and continue to be offered. Training materials can also be downloaded from the website. Support for community and technical colleges continues.

**Expected Impacts:** LMS is used by many different users to develop management plans that demonstrate both economic and a broad array of environmental values. It allows owners to develop more sustainable economic plans that are consistent with regulatory objectives and provides collaborative groups the opportunity to satisfy multiple objectives.

### **Examples of Papers, Presentations, and Training**

LMS Training for BLM, June 17-19, 2002.

Teaching Forest Stand Dynamics using LMS (FM 424/503) Winter 2003

Understanding Forest Economics and Management using the Landscape Management System (FM461), March 4, 2003

### **Publications:**

Bowyer, J., D. Briggs, B. Lippke, J. Perez-Garcia, J. Wilson. 2004. Life Cycle Environmental Performance of Renewable Materials in Context of Residential Building Construction: Phase I Research Report. Consortium for Research on Renewable Industrial Materials CORRIM Inc. Seattle WA. 60pp +15 chapter modules of approximately 600pp.

Including LMS supported modules:

Johnson, L., B. Lippke, J. Marshall, J. Cornnick. Module A - Forest Resources: Pacific Northwest and Southeast. 67pp

Manriquez, C., J. Perez-Garcia, B. Lippke, J. Cornnick. Module N – Tracking Carbon from Sequestration in the Forest to Wood Products and Substitution. 22pp

Lippke, B., and J. Cornnick. Module O – Environmental Index for the Forest. 19pp

**Directed Appropriations to the University of Washington (cont)**  
**FY2000- FY2006 *Funding Bills, unless otherwise noted.***

**DANIEL J. EVANS SCHOOL OF PUBLIC POLICY**

**FY2000**

Department of Education, Sec. 309 Additional Funding for Higher Education, (page 555 of House Report 106-479) “\$3,000,000 shall be awarded to the Daniel J. Evans School of Public Policy at the University of Washington.”

**OBJECTIVES/ ACCOMPLISHMENTS**

In FY 2000 The University of Washington named its School of Public Affairs for former U.S. Senator and WA Governor, Daniel J. Evans. In an effort to join with the University in honoring their colleague and to ensure the training of future public servants in the model of Daniel Evans, the Congress awarded these funds. The funds have been used as an endowment to pay for scholarships and traineeships.

The Evans School of Public Affairs is ranked nationally in the top tier of schools of public policy and management and is the pre-eminent school in the Northwest. For those who wish to actively shape public policy and the democratic tradition, the School is a vibrant community, offering many opportunities for learning, research, professional development, and public engagement.

The Evans School offers several fellowships to entering students each year from the School’s endowed funds. These are grants awarded primarily on the basis of academic achievement and/or excellence in public service, including the **Daniel J. Evans Fellowship** that honors former U.S. Senator Evans. Fellowships awarded from the endowment support students who aspire to excellence in public service.

More information on the school can be found at: **<http://evans.washington.edu/index.php>**

**Directed Appropriations to the University of Washington (cont)**  
**FY2000- FY2006 Funding Bills, unless otherwise noted.**

**COMPETITIVENESS OF AGRICULTURE PRODUCTS - CINTRAFOR**

**FY2001**

Department of Agriculture, Cooperative State Research, Education, and Extension Services (page 108 of House Report 106-948): "Competitiveness of agriculture products (WA)..... \$680,000"

**FY2002**

Department of Agriculture, Cooperative State Research, Education, and Extension Services (page 54 of House Report 107-275): "Competitiveness of agriculture products (WA) .... \$665,000."

**FY2003**

Department of Agriculture, Cooperative State Research, Education, and Extension Services (page 560 of House Report 108-10): "Competitiveness of Agricultural Products (WA).....\$680,000."

**FY2004**

Department of Agriculture, Cooperative State Research, Education and Extension Services (page 474 of House Report 108-401): "Competitiveness of Agricultural Products (WA).....\$608,000."

**FY2005**

Department of Agriculture, Cooperative State Research, Education, and Extension Service (Page 667 of House Report 108-792): "Competitiveness of Agricultural Products (WA) ..... \$652,000."

**FY2006**

Department of Agriculture, Cooperative State Research, Education, and Extension Service, (page 65 of House Report): "Competitiveness of Agricultural Products.....\$679,000."

**OBJECTIVES/ ACCOMPLISHMENTS**

CINTRAFOR, through the College of Forest Resources at the University of Washington and IMPACT at Washington State University, works collaboratively to apply interdisciplinary solutions to the challenges facing U.S. forest products manufacturers and agricultural producers in accessing and marketing their products in traditional international markets as well as helping exporters identify and evaluate emerging market and niche market opportunities for their products.

The federal funding that CINTRAFOR receives through the USDA CSREES program remains crucial in providing a stable foundation for the research program that enhances our ability to attract external funding. In FY 2005-2006, CINTRAFOR generated \$2.18 in non-federal funds for every dollar of federal funding received. In 2004, an independent peer review of CINTRAFOR and its research programs observed that: "[CINTRAFOR is] a unique, and well-recognized, interdisciplinary international research and outreach program with dedicated and productive faculty, staff, and graduate students."

**CINTRAFOR Research:** CINTRAFOR's research program is a long-term continuing effort to identify new and emerging challenges and improve the competitiveness of the U.S. forest products industry.

- Covering marketing, economics policy analyses related to the competitiveness of the US forest product sector, the objectives of CINTRAFOR research include:
  - Identifying emerging markets
  - Improving product and market competitiveness
  - Conducting trade and environmental assessments

- Performing socioeconomic impact and stability analysis

CINTRAFOR research results are disseminated to industry managers and public policy makers through a wide variety of forums:

- Faculty members and collaborators have published over 250 papers.
- An accessible and well-regarded Working Paper series with over 100 publications.
- A CINTRAFOR Newsletter that is published three times per year.
- An annual International Forest Products Marketing Conference.

**CINTRAFOR Education:** Over 60 alumni with masters and Ph.D. degrees employed by:

- Forest products industry.
- U. S. federal and state government agencies.
- Ministries and government agencies in key foreign markets in Asia and Europe.
- National and international NGO and consulting firms.
- Academia.

**CINTRAFOR Outreach:** Over 500 contacts annually through Center-sponsored Conferences, presentations and other activities

- An annual international forest products market outlook conference.
- Over 30 presentations annually by faculty and staff.
- Over 10,000 contacts through US-China Build Program annually.

### **Examples of Papers**

Wood Market Trends in Japan. Chris Gaston, David Cohen & Ivan Eastin. 2006. SP-43-R

Innovative Fence Designs From Small Diameter Timber: Adding Value Through Design. Ivan Eastin, Roger Williams, Judy Boardman & Jesi Asagi. 2005. SP40

Discrepancies in Forest Products Trade Statistics. Ivan Eastin & John Perez-Garcia. 2004. (58 pp) **WP95**

The Importance of Oregon's Forests in US and International Markets: Meeting the Needs of Future Consumers of Forest Products and Environmental Services. John Perez-Garcia. 2003. (104 pp) **WP92**

Chile's Forest Products Industry: A Country Profile. Shelley Gardner, Ivan Eastin. 2002. (107 pp) **WP90**

**Directed Appropriations to the University of Washington (cont)**  
**FY2000- FY2006 *Funding Bills, unless otherwise noted.***

**OLYMPIC NATURAL RESOURCE CENTER**

**FY2000**

Department of Interior, U.S. Fish and Wildlife Service (page 442 of House Report 106-479):  
“...include an increase of \$200,000 for Spartina grass research at the University of Washington.”

**OBJECTIVES/ ACCOMPLISHMENTS**

This directed appropriation was provided to the Coastal Resources Alliance (CRA) as an amendment to their cooperative agreement. The CRA then subcontracted with UW Olympic Natural Resources Center (ONRC) to conduct bio-control research and implementation to control an invasive plant, Spartina, that is plaguing parts of the Pacific Northwest. ONRC is located on the Olympic Peninsula in Forks, Washington, and provides scientific information to address critical issues and solve problems concerning forestry and marine sciences in the region. Spartina is a non-native invasive species (NIS) of plant that is affecting critical habitat (e.g., Willapa Bay) in the Pacific Northwest, and on the Olympic Peninsula. As an aggressive exotic invader in the Pacific Northwest, Spartina species have displaced native assemblages associated with the regions, open mud-flat estuaries, replacing them with dense monotypic meadows and terrestrially-associated communities. Invasive cordgrass species are altering the basic food web upon which many of the region's ecologically and commercially important native species depend. Unlike many NIS invasions, the Spartina problem is a high priority NIS problem that appears amenable to management, but ecologically sound, effective, and affordable new control techniques are urgently needed. Biological control is considered the most promising new tool for Spartina control in Willapa Bay, the site of the largest infestation.

In 2000, the ONRC hired Dr. Fritz Grevstad to lead that effort. She has reared, released, and monitored the adaptation, expansion, and impacts of populations of the insect approved for biological control of the invasive cordgrass Spartina alterniflora. Dr. Grevstad has established populations of prokelisia from California, Rhode Island, South Carolina, and Georgia in Willapa Bay and compared their success and impacts. ONRC's bio-control efforts have been an important component to the interagency integrated pest management approach to controlling Spartina. The following tasks were undertaken to achieve objectives in Spartina grass research in 2001: (1) To prepare for evaluation of biological control releases on Spartina, the primary investigator (PI) assembled relevant data on prerelease conditions and identified where feasible how to redress key data gaps; (2) To support the design of an effective IPM program incorporating biological control and to increase understanding, the PI configured several models to simulate plant and insect population dynamics and their interactions; (3) The PI prepared a release strategy appropriate to conditions in Willapa Bay to the the Spartina problem; (4) To support more precise allocations of control resources, the PI investigated genetic bases of herbivore sensitivity and herbicide sensitivity and morphological indicators of herbivore vulnerability; (5) To deliver this critical information to key policy setters and official participants in the Spartina control program, the PI provided periodic in-depth presentations about the project's research developments; and (6) To secure public acceptance and cooperation, the PI provided a series of education and outreach activities aimed at local residents, stakeholder groups, and the general public.



**FY2001**

Department of Interior, Forest and Rangeland Research (page 155 of House Report 106-194):  
“\$250,000 to the University of Washington silviculture effort at the Olympic Natural Resource Center.”

**OBJECTIVES/ ACCOMPLISHMENTS**

Managing natural resources at large spatial scales, particularly across political and land ownership boundaries, is one of the greatest challenges of ecosystem management. For any specific biogeographic region, it is valuable to have a repository of geo-referenced data on natural resources that can be accessed by both governmental and non-governmental organizations. A GIS clearinghouse is needed for large-scale resource management and analysis on the Olympic Peninsula. This project will deliver a comprehensive database of metadata (data about data, or descriptions of datasets) for geo-referenced information to the Olympic Natural Resources Center that will be maintained by the ONRC GIS lab. This database will be designed to be easily accessible and easily understood by all users and clients who contact ONRC. In addition, the project will develop a World Wide Web site for ONRC that will provide access to the database and contain “pointers” for databases at various agencies and nongovernmental organizations. Protocols will be established for maintaining and updating metadata contributed to the database, and training will be provided to database users and cooperators. The data clearinghouse will be a single, easy-access point through which land managers, scientists, decision makers, and citizens of the Olympic Peninsula can preview and acquire geographic information on natural resources.

The Olympic Peninsula Clearinghouse is now a fully operational node of the National Spatial Data Infrastructure and National Biological Information Infrastructure, and has strong regional support from agencies and nongovernmental organizations.

See: <http://www.onrc.washington.edu/clearinghouse/> for more information on the capabilities and information provided through this program.

**Directed Appropriations to the University of Washington (cont)**  
**FY2000- FY2006 Funding Bills, unless otherwise noted.**

**UNIVERSITY OF WASHINGTON LIFE SCIENCES FACILITY – BIOENGINEERING  
AND GENOME SCIENCES**

**FY2002**

Department of Health and Human Services, Health Resources and Services Administration (page 71 of House Report 107-342): “These funds are to be used for the following projects....University of Washington, Life Sciences Facility, Seattle, Washington- \$6,000,000.”

**FY2003**

Department of Health and Human Services, Health Resources and Services Administration (page 1072 of House Report 108-10): “University of Washington Life Sciences Research facility, Seattle, WA.....\$3,500,000”

**FY2004**

Department of Health and Human Services, Health Resources and Services Administration, (page 750 of House Report 108-401): “University of Washington to construct a life-sciences building ..... \$1,000,000”

**FY2005**

Department of Health and Human Services, Health Resources and Services Administration, (page 1151 of House Report 108-792): “University of Washington, Seattle, WA for construction of a life sciences building .....\$1,500,000”

**OBJECTIVES/ ACCOMPLISHMENTS**

During Federal fiscal year 2002, funding for the “Health Care and Other Facilities” Grants for Construction and Renovation (CFDA #93.887) was made available through the Department of Health and Human Services Appropriations Act (Public Law 107-116). In response to this CFDA #93.887, the University of Washington (UW) submitted a construction grant application to the Health Resources and Services Administration (HRSA) requesting funds for the construction of a new Bioengineering Building at the UW.

The Department has had a reputation for excellence in bioengineering research since its formation in 1967, and that reputation has continued to define the program for nearly four decades. Belonging to both the College of Engineering and the School of Medicine, Bioengineering has forged a place where truly cross-disciplinary approaches to research occur with innovative results, and has emerged as a model program in interdisciplinary research and education. For the last decade, the Department of Bioengineering at the University of Washington has been the proud recipient of more National Institutes of Health (NIH) competitive funding than any other bioengineering department in the United States and has been ranked in the top five programs in bioengineering by the National Research Council and US News and World Report. UW Bioengineering is home to some of the most exciting research being done in this discipline, and our inventions to date include ultrasound machines, the Sonic Toothbrush, microfluidics, smart biomaterials, and medical imaging systems and applications. The major areas of UW Bioengineering research and education include Distributed Diagnosis and Home Healthcare (D2H2), Engineered Biomaterials and Tissue Engineering, Molecular Bioengineering and Nanotechnology, Medical Imaging and Image-Guided Therapy, and Computational and Integrative Bioengineering.

The construction of a new Bioengineering Building was aimed to provide the necessary space and amenities to support existing and future programs and intended to consolidate the department's many research groups from a scattered footprint spanning nine different buildings to a single location, providing for the synergistic benefits of proximity. The purpose of the Bioengineering Building has been to house multidisciplinary collaborative research and training programs in a state-of-the-art facility and to accelerate the application of new technologies to clinical practice to benefit the public. The 122,000 gross square foot building was designed with approximately 65,000 assignable square feet of program area. At the time of submission, total construction costs for the Bioengineering Building were estimated at \$56 million (increased to \$57.2 million by the time of the first award). In addition to the HRSA request, the remaining project expenses would be funded by a \$10 million gift from the Whitaker Foundation, \$19 million bonding package, and with gifts from other private sources.

Major building design goals for the Bioengineering Building included:

- Flexible and adaptable wet laboratory space designed to accommodate disparate research activities with lab support spaces in close proximity.
- Functional office areas adequately designed to accommodate research activity convenient to the laboratories.
- Formal and informal interaction spaces, including circulation patterns and common space arrangements that promote synergy and encourage collegial interaction among faculty and students.
- Labs designed for safety and productivity with good serviceability and state-of-the-art equipment and support services.

The anticipated timeline for this project in 2002 was:

- Schematic Design ..... April 15-July 31, 2002
- Design Development ..... August 6-December 17, 2002
- Construction Documents ..... January 21-August 8, 2003
- Quality Assurance ..... August 11-September 26, 2003
- Construction ..... October 7, 2003-August 8, 2005
- Client Move-In ..... November 3, 2005

In June 2002, the UW received Notice of Award for the HRSA Construction Grant Application, award number C76 HF 00465 01, with an initial award of \$5.9 million. We received HRSA's second award of \$3.44 million in September 2003. Along with the first round of funding in FY2002, the FY2003 HRSA monies were applied toward the costs of initial design development and quality assurance for the Bioengineering Building.

A \$70 million gift from the Bill & Melinda Gates Foundation, announced as the largest single private donation to an institution of higher education in the Northwest in April 2003, facilitated, accelerated, and expanded construction of the building and united the Department of Genome Sciences with Bioengineering, in an adjacent facility. Of that gift, \$50 million was for building construction.

In August 2004, the UW received the third HRSA award totaling \$1.0 million for construction-related expenditures, and a final award in December 2005 of \$1.5 million toward the completion of the Bioengineering Building.

### **LIST OF ACCOMPLISHMENTS**

The \$70 million from the Gates Foundation finalized plans for construction and increased the total building square footage to 265,000 gross ft<sup>2</sup> with about 50% allocated to UW Bioengineering. Ground-breaking for the new Bioengineering-Genome Sciences Building was on August 12, 2003. The groundbreaking was attended by UW's then President Dr. Lee Huntsman, U.S. Senator Patty Murray, U.S. Representative Norm Dicks, and other members of the University and local communities.

From design through construction, excitement grew within the department and beyond. Bioengineering maintained its top rankings in NIH research funding and continued its role as a national leader in graduate education, technology transfers, and corporate research partnerships.

On March 8, 2006, former U.S. President Jimmy Carter gave the keynote speech for the new building's dedication ceremony. Microsoft co-founder Bill Gates and Dr. William H. Foege, for whom the building is named, spoke as well.

The \$12 million in HRSA building funds approved by the Congress served as a basic investment that inspired philanthropy and other investment for a total of \$150 million. A four decade old dream was finalized in April 2006 as the last of department's faculty, students, and research groups completed the move into the William H. Foege Building. For the first time in its history, Bioengineering was located together in a single, contiguous facility. The new facility provides a truly cohesive place where we can continue to strive towards achieving our mission of unmatched excellence – and having an impact in improving the quality of healthcare in the U.S. and elsewhere. The building will provide a solid foundation for us to realize our vision of continuing to serve a worldwide leadership role in Bioengineering research, education, service, clinical applications, and technology transfer.

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**UNIVERSITY OF WASHINGTON CENTER FOR HEALTH WORKFORCE STUDIES**

**FY2002**

Department of Health and Human Services, Health Resources and Services Administration (page 11 of House Report 107-342): “\$500,000 shall be for the University of Washington Center for Health Workforce Studies in Seattle, Washington, for a demonstration project to collect and analyze health workforce data”

**OBJECTIVES/ ACCOMPLISHMENTS**

The University of Washington Center for Health Workforce Studies is one of six regional centers funded by the National Center for Health Workforce Analysis of the federal Bureau of Health Professions, Health Resources and Services Administration. Major goals are to conduct policy-relevant health workforce research, often in collaboration with government agencies, health providers, and other researchers; to provide consultation to local, state, regional, and national policy makers on health workforce issues; to develop and refine analytic methods for measuring health workforce supply and requirements; to contribute to the understanding of health workforce issues and findings; and to disseminate study results to a wide audience.

The University of Washington Center for Health Workforce Studies (CHWS) received \$500,000 in an appropriation from Congress in 2002 to collect and analyze health workforce data in Washington. Following is a summary of what CHWS has accomplished to-date with these funds. More information is available from CHWS’ web site –

**<http://www.fammed.washington.edu/chws/2002appropriation>**

**Policy Activities supported by the Appropriation**

- Provided data to the statewide Washington Health Personnel Shortage Task Force and participated in its Committees.
- Participated in planning efforts to improve Washington’s data resources for health workforce planning.
- Responded to requests for information about Washington’s health workforce by policymakers, researchers, news media, and the public.
- Presented findings describing Washington’s health workforce at conferences and seminars.

**With Resources from the Appropriation, CHWS has:**

- Assessed hospital employment and vacancy statistics for nursing, laboratory, radiology, pharmacy, medical records, and other staff through surveys of Washington hospitals during 2002-04. This work also explored staff contracting efforts and barriers to physician recruitment. State and regional health workforce planning efforts have used these data (reports available at <http://www.fammed.washington.edu/chws/2002appropriation>).
- Described hospital business office staffing issues and policy priorities through a survey of hospital CEOs (study in progress).
- Surveyed retail pharmacies across the state to determine vacancy and employment rates for pharmacists and pharmacy technicians (joint study with other University departments in progress).

- Surveyed physicians and midwives about the effect of increases in liability insurance on their ability to provide obstetrical services and explored how their practice patterns affect access to OB care in the state (study in progress).
- Compiled statistics on health program completions from Washington educational institutions — data not previously summarized (report available at <http://www.fammed.washington.edu/chws/2002appropriation>).
- Surveyed nurse practitioners to learn how many were educated in-state, how many work full vs. part-time, the extent to which they provide care to underserved populations, about their use of newly acquired expanded drug authority, and other characteristics of their clinical practices (study in progress).
- Surveyed dental hygienists to learn more about their backgrounds and work characteristics, such as how many were educated in-state, how many work full time vs. part-time, and how many work independently of dentists (study in progress).
- Conducted a survey to learn more about why some RNs leave the nursing field. RNs who recently dropped their Washington licenses are being asked if they are currently working, where and in what field they work, and to share their views of nursing today (study in progress).
- Developed models to project the supply and demand for radiographers, pharmacists, and dental hygienists through 2020. The models reveal the paucity of health workforce planning data in Washington state and identify areas where more data are needed.  
(reports available at [\*\*http://www.fammed.washington.edu/chws/2002appropriation\*\*](http://www.fammed.washington.edu/chws/2002appropriation))

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**UNIVERSITY OF WASHINGTON, TACOMA - INSTITUTE OF TECHNOLOGY**

**FY2002**

Department of Education; FIPSE (page 157 of House Report 107-342): “University of Washington, Tacoma, Washington, for faculty, curriculum development and equipment acquisition to establish a technology institute- \$100,000”

Housing and Urban Development; Community Development (page 106 of House Report 107-272): “\$250,000 to the University of Washington-Tacoma for development of the Institute of Technology.”

**OBJECTIVES/ ACCOMPLISHMENTS**

The Institute of Technology at the University of Washington Tacoma was established in 2001 to help expand the number of tech-savvy employees graduating from state universities to support Washington’s high tech industry, expand opportunities in technology fields for women and underrepresented groups, and to spur economic development in a densely populated region that had not enjoyed the benefits of the tech economy. The Institute was proposed by the Governor and funded by with \$5.8 million in Washington state funds and \$5 million from non-state funders, including corporations, government entities (city, county, port, federal), and private individuals.

The Institute of Technology received \$100,000 from the U.S. Department of Education and \$250,000 from the U.S. Department of Housing. The funds were used to build the specialized labs required along with offices and classrooms to make the educational program possible.

Shortly after the Institute was established, the dot-com industry went into a dramatic decline. However, the Institute has graduated more than 200 students well versed in computer science and software development. As the Institute has grown, degree options have expanded and now include a variety of options at the bachelor’s level and a master’s degree program. Additional options will be available soon to better meet student and industry demand. Institute graduates are highly valued in the industry that has maintained its strength after the initial dot-com decline and is beginning to grow again.

**Directed Appropriations to the University of Washington (cont)**  
**FY2000- FY2006 Funding Bills, unless otherwise noted.**

**UW APPLIED PHYSICS LABORATORY: REMOTE ACOUSTIC HEMOSTASIS**

**FY2003**

Department of Defense, Research, Development, Test, and Evaluation, Army; Medical Technology, (page 241 of House Report 107-732): “Remote Acoustic Hemostasis....\$7,000,000”

**FY2004**

Department of Defense; Research, Development, Test and Evaluation, Army; Medical Technology, (page 245 from House Report 108-283): Remote Acoustic Hemostasis.....\$8,000,000.”

**OBJECTIVES/ ACCOMPLISHMENTS**

NOTE Amount listed above was not the amount received by UW. Main contract went to the National Center for Physical Acoustics in Mississippi.

The University of Washington’s Applied Physics Laboratory (APL), Center for Medical and Industrial Ultrasound (CIMU) received \$2,094,500 from NCPA in FY 2003, \$2,100,000 from NCPA in FY 2004; and \$600K from NCPA in FY2006 for Remote Acoustic Hemostasis (RAH) research and medical device prototype development.

In 2001, APL-CIMU researchers showed that high intensity focused ultrasound (HIFU) could be delivered transcutaneously (through the skin), which would enable doctors to treat traumatic battlefield and other accident injuries and other conditions without surgery. HIFU’s therapeutic action produces high heat and can cause the cessation of blood flow, called acoustic hemostasis.

In FYs 2003, 2004, and 2006, Congress appropriated funding to the U.S. Army for RAH research and medical device prototype development. Congressional funding from the Army led to a cooperative research agreement between it and the University of Mississippi’s National Center for Physical Acoustics (NCPA). This in turn led to a subcontract for RAH research and device prototype development work by APL/UW’s Center for Medical and Industrial Ultrasound and NCPA.

The Army is very interested in this surgical technique as a way to aid in combat casualty care at forward echelon units. CIMU has developed several medical device prototypes for the RAH project, gaining it international and Army recognition and commendation.

APL CIMU also developed technology and intellectual properties that lead to the creation of Focus Surgery Inc. and the creation of jobs in Seattle, Washington.

**Examples of Peer-Reviewed Publications for Remote Acoustic Hemostasis Awards**

**2006**

Held RT, Zderic V, Nguyen TN, and Vaezy S, “Annular phased-array high-intensity focused ultrasound device for image-guided therapy of uterine fibroids,” IEEE Trans UFFC, 53 (2), 335-348 (2006)

**2005**

Lafon C, Sapozhnikov OA, Khokhlova VA, Kaczkowski PJ, Bailey MR, and Crum LA, “Use of a bovine eye lens for real-time observation of HIFU-induced lesion evolution,” Ultrasound Med Biol, 31 (10), 1383–1389 (2005)



## **2004**

Cornejo CJ, Vaezy S, Jurkovich GJ, Paun M, Sharar SR, and Martin RW, "High-intensity ultrasound treatment of blunt abdominal solid organ injury: An animal model," J Trauma, 57 (1), 152-156 (2004)

## **2003**

Prokop AF, Vaezy S, Noble ML, Kaczkowski PJ, Martin RW, and Crum LA, "Polyacrylamide gel as an acoustic coupling medium for focused ultrasound therapy," Ultrasound Med Biol, 29 (9), 1351-1358 (2003)

## **2002**

Hwang JH, Kimmey M, Martin R, Vaezy S, "Acoustic hemostasis of lacerated veins: Potential applications for gastrointestinal bleeding," Gastrointestinal Endoscopy, 55 (5): M1883 Suppl. S (2002)

## **Book Chapter and Thesis**

Cunitz BW, "Vector-Doppler ultrasound system for the detection of internal bleeding," Master's Thesis University of Washington. December 2005.

BROSENS: Uterine Fibroids: Pathogenesis & Management. Treatment of Uterine Fibroids: New Non-Invasive Developments High Intensity Focused Ultrasound. Vaezy S, Zderic V, Fujimoto V. In Press.

## **Examples of Proceedings**

### **2004**

Andrew M, Kargl S, Kaczkowski P, Cunitz B, and Brayman A, "Circular scanned thermal lesions in ex vivo bovine liver," In Therapeutic Ultrasound, Proceedings of the 3rd International Symposium, J.Y. Chapelon and C. Lafon, eds, (INSERM U556), 359-364 (2004)

### **2003**

Anand A, Kaczkowski PJ, et al., "Using the ATL HDI 1000 to Collect Demodulated RF Data for Monitoring HIFU Lesion Formation," Medical Imaging 2003: Ultrasonic Imaging and Signal Processing, Proc. of SPIE 5035, *Editors*: William F. Walker, Univ. of Virginia; Michael F. Insana, Univ. of California/Davis (2003)

## **Examples of Oral Presentations**

### **2005**

Vaezy S, Zderic V, Foley J, Luo W, Starr F, Lebedev A. Thermal effects of HIFU at soft tissue-air interface in the post-focal region: A safety concern, and a potential solution using cavitation. IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society Symposium, Rotterdam, September 2005

### **2003**

Anand A and Kaczkowski PJ. Monitoring evolution of HIFU-induced lesions with backscattered ultrasound. Presented at: 145th meeting of the Acoustical Society of America, Nashville, Tennessee, 28 April – 2 May, 2003

**Directed Appropriations to the University of Washington (cont)**  
**FY2000- FY2006 Funding Bills, unless otherwise noted.**

**UNIVERSITY OF WASHINGTON - WWAMI**

**FY2003**

Department of Health and Human Services, Health Resources and Services Administration (page 1077 of House Report 108-10): “University of Washington, School of Medicine, Seattle, Washington, for WWAMI (Wyoming, Washington, Alaska, Montana, Idaho) Demonstration/Assistance Rural Training project ..... \$500,000”

**FY2005**

Department of Health and Human Services, Health Resources and Services Administration, (page 1151 of House Report 108-792): “University of Washington, School of Medicine, Seattle, WA for Wyoming state participation in the WWAMI regional pilot program to help address the shortage of health professionals in the rural WWAMI region ..... \$50,000”

**FY2005**

Department of Health and Human Services, Health Resources and Services Administration, (page 1151 of House Report 108-792): “University of Washington, School of Medicine, Seattle, WA, for WWAMI rural training project ..... \$340,000”

**OBJECTIVES/ ACCOMPLISHMENTS**

**ALASKA:** Alaska Family Practice Residency (AFPR) is supporting 12 frontier rotations with DART (Demonstration/ Assistant Rural Training) funds. DART funding covers the absence of the resident from the residency’s clinical operation. The Alaska WWAMI Medical Education program used DART funding to increase the opportunities for rural students to pursue health careers in rural settings. To leverage the dollars, we partnered with the U-DOC / Della Keats Summer Enrichment Program at the University of Alaska Anchorage and the National High School Student Summer Research Program of the National Institutes of Diabetes and Digestive and Kidney Diseases (NIDDK).

The Family Medicine Residency used DART funding to promote rural health careers for new Alaska physicians. Like many highly rural states, Alaska is challenged to provide an adequate supply of physicians in rural sites. One well-recognized means to encourage physicians to practice in rural locations is to expose them to and train them for that kind of practice environment, especially during residency training. The Alaska Family Medicine Residency (AFPR) sends all resident trainees to rotations in the Bethel region of rural Alaska. Fifty percent of the graduates of AFPR have elected to practice in rural locations.

**IDAHO:** Idaho’s residencies in Boise and Pocatello are each sponsoring frontier and rural rotations using DART funds. Boise developed new rotations for residents in Emmett, Cottonwood, St. Maries, Jerome, and Idaho Falls. Pocatello developed resident rotations at Rexburg, Blackfoot, and Soda Springs. All residents on rural rotations are required to complete two “youth outreach” activities which encourage health careers. One resident wrote a newspaper article about health careers and talked with the local athletic teams, where he was helping out coaching and providing medical care. Another planned an outreach activity at a local fair. Stimulated by the DART funding, both programs began rural faculty exchanges. The rural physician becomes a member of

the residency faculty while the mainsite faculty cover the rural practice. Exchanges have taken place in Malad, Driggs, and Plummer and were an overwhelming success.

The RHTI Funds for the FMRI in Boise were used to help fund multiple rural rotations for our R-1's, R-2's, and R-3's. The locations of these rural Idaho rotations included Emmett, Weisser, Jerome, Mountain Home, Cottonwood, McCall, Hailey, Grangeville, and Orofino. We were also able to have a rural surgical rotation in Twin Falls that is now entering its second year and is very popular with the residents. By having these funds, these young men and women were able to go to these rural rotations and have exceptional Family Medicine experiences all designed to help lower the barriers for them to choose those sorts of practice locations in the future. The Idaho WWAMI office used the funding we received for medical students to participate in a month-long medical immersion experience in a local community. The funding also was used for travel expenses for faculty continuity with Idaho medical students.

**MONTANA:** The Montana Family Practice Residency in Billings is using DART funding to support a rural rotation for residents in the second and again in the third year. The resident chooses the site, which must meet the programs definition of rural (pop. 10,000 or less) or be an Indian Health Service practice site. The majority (85%) of the sites chosen are pop. 3,500 or less. Rotations funded by DART have occurred in Glasgow, Gardiner, Big Sky, Red Lodge, Worden, Crow Agency, and Hardin.

**WASHINGTON:** DART funding has allowed the very successful rural training track (RTT) sites in Goldendale and Colville to continue training residents this year. Both have been threatened by closure in the last two years for purely financial reasons. Residents at Spokane Family Medicine are required to do a rural rotation in their final year of training to help them look at rural practice opportunities. DART funding will support this program. Rotations this year will take place in Soda Springs ID, Nephi UT, Tremonton UT, Cottonwood ID, Kalispell MT, and Ronan, MT. For pipeline activities, the Goldendale RTT residents and faculty conducted Mini-Medical School and Health Careers Day at Goldendale High School in May. Residents and faculty organized this to include nurses, hospital administrators and pharmacists who all conducted a hands-on session with about 20 students and talked about health careers. The first resident in White Salmon and local nurses did a presentation to local youth on women in health careers.

**WYOMING:** The University of Wyoming's two residencies in Casper and Cheyenne have developed rural rotations. Cheyenne has developed a rural general surgery rotation for their residents in Torrington, WY. In Casper, when offered an additional month to do rural medicine funded by DART, five residents accepted the opportunity. All of these resident rotations are being used to explore potential practice sites. The RHTI funding allowed the University of Wyoming's two Family Medicine Residency Programs to expand rural medical training efforts. One faculty member at each site was assigned specifically to work with residents to schedule rural rotations. DART funds also allowed the University of Wyoming of Wyoming WWAMI Medical Education Program to work with the Wyoming Area Health Education center to offer three "medical summits" – medical and health professional recruitment programs that targeted junior high, high school, and undergraduate college students and their families.

**Directed Appropriations to the University of Washington (cont)**  
**FY2000- FY2006 Funding Bills, unless otherwise noted.**

**UW – MUSCULAR DYSTROPHY RESEARCH CENTER**

**FY2005**

Department of Health and Human Services, Health Resources and Services Administration (page 1151 of House Report 108-792): “University of Washington, Seattle, WA, for facilities and equipment for a muscular dystrophy research center building .....\$50,000”

**OBJECTIVES/ ACCOMPLISHMENTS**

The directed appropriation funded the acquisition of equipment for muscular dystrophy research. Some funds are as yet unspent, due to lack of space for new equipment. Equipment acquired:

- 1) QImaging Retiga 2000 camera and software for muscle histology image acquisition/processing = \$8,000
- 2) Microscope Stage = \$8,000
- 3) IBM workstation with Montage software = \$6-8,000

**Publications produced from research:**

*Acta Myologica.* 2005 Dec ;24:184-93

*Gene therapy for Duchenne muscular dystrophy: AAV leads the way.*

L M Judge, J S Chamberlain

*Human Molecular Genetics.* 2006 Apr 4;

*A highly functional mini-dystrophin/GFP fusion gene for cell and gene therapy studies of Duchenne muscular dystrophy.*

Sheng Li, En Kimura, Rainer Ng, Brent M Fall, Leonard Meuse, Morayma Reyes,

John A Faulkner, Jeffrey S Chamberlain

*Journal of Cellular Science.* 2006 Mar 28;;

*Dissecting the signaling and mechanical functions of the dystrophin-glycoprotein complex.*

Luke M Judge, Miki Haraguchi, Jeffrey S Chamberlain

*Molecular Therapy.* 2006 Feb ;13:241-9

*Gene therapy strategies for duchenne muscular dystrophy utilizing recombinant adeno-associated virus vectors.* Michael J Blankinship, Paul Gregorevic, Jeffrey S Chamberlain

**FY2005**

Department of Energy, Biological and Environmental Research, (page 946 in House Report 108-792): "\$125,000 for Duchenne Muscular Dystrophy research-related equipment at the University of Washington-Seattle."

**FY2006**

Department of Energy, Office of Science (page 151 of House Report 109-275): "Duchenne Muscular Dystrophy research Univ. of Washington School of Med. (WA) .....\$300,000"

**OBJECTIVES/ ACCOMPLISHMENTS**

FY2005 and FY2006 earmarks funded will fund the acquisition of equipment upgrades for muscular dystrophy research. Some funds are as yet unspent, due to lack of space for new equipment.

Equipment acquired:

- 1) Stoelting rotorod = \$6,032
- 1) Molecular Dynamics Phosphorimager STORM 840PC = \$42,132
- 2) Applied Biosystems Taqman automated real-time PCR machine = \$38,060

FY2006 Monies not yet received. Application sent in July 2006. Funds requested for equipment for muscular dystrophy research.

- 1) Kodak Image Station 4000mm Digital Imaging System
- 2) CTL Laboratories Series 3B Analyzer
- 3) Microfluidics Microfluidizer, M110S
- 4) Vevo 660 high-resolution imaging system
- 5) BD Biosciences FACSCalibur Cell Sorting System

**Directed Appropriations to the University of Washington (cont)**  
**FY2000- FY2006 Funding Bills, unless otherwise noted.**

**WASHINGTON STATE RURAL TECHNOLOGY INITIATIVE**

**FY2005**

Department of Interior, State and Private Forestry (page 1070 of House Report 108-792): “WA state rural technology initiative ..... \$600,000.”

**OBJECTIVES/ ACCOMPLISHMENTS**

Rural Technology Transfer (FY 2005: \$562,400 from March 1, 2005 to Dec. 31, 2006)

The Rural Technology Initiative (RTI) was created by a direct request to Congress from rural communities in Washington state to create a pilot project to transfer forest management and forest engineering technology developments to rural forest sector communities. RTI was organized at the University of Washington in partnership with Washington State University and their Cooperative Extension Services. Rural communities had grave concerns that the science being used to justify increased regulations would put them out of business unless they could use technology to justify better solutions. A Rural Advisory Board was established to set priorities and facilitate rural participation. The Board included non-industrial forest owners, rural conservation and economic development district leaders, the Washington Farm Forestry Association, the Forest Training Center, contract loggers, the Hardwoods Commission, woodworkers, tribes, community colleges, USFS, and other community leaders. Ten projects were initiated from the FY2000 funding and priorities determined for future needs.

**Projects in Process:**

1. **Forest Health Density Management and Extension Training.** Support is being provided for on the ground (community-based) planning demonstrations based on ground-collected inventory data and best practice density thresholds designed to accommodate carrying capacity. An extension of the analysis of alternative plans to reduce fire risk and reduce economic costs as presented to the Forest Health committee in September is needed. Density thresholds need to be refined for more forest types and carrying capacities for training and applications by Field Extension Foresters. Supplemental State supported Forest Health funding is anticipated.
2. **Managing Eastside Forests within their Sustainable Dynamic Range:** Based on the literature and reconstructed stand data, we have better information on the range and location of crown bulk densities relative to ladder fuels that support crown fires. We expect to be able to develop site dependent management alternatives that will be ecologically and economically sustainable within the historical dynamic range for a sample of forest types and carrying capacities.
3. **Forest Health Database Development Cooperation.** A pilot test is needed to determine the best nearest neighbor algorithm and remote-sensing data to use for developing comprehensive forest health metrics for the eastside. The question to be answered: Is it possible to produce accuracy (information at a fine enough level of resolution) sufficient to identify true problems at the owner or local level from existing inventory plots and remotely sensed data sources? We expect supplemental State funding from the Forest Health Project.

4. **FFF HCP Technical Support:** A large woody debris simulation model that measures potentially available functional large woody debris (AFLWD) has been developed and scientifically reviewed. Similarly, an assessment procedure to determine whether riparian stands are similar to a desired future condition, i.e. old natural forest conditions, has been developed and reviewed. Documentation of the methodology is needed for use by regulators and model users. Using this training material, a series of training sessions for the trainers needs to be initiated.
5. **Support for Users of Alternate Plan Templates:** Within the negotiation of what constitutes acceptable alternative plans, we need to be prepared to evaluate costs and assess the suitability of desired future conditions for a select set of alternate plans that may be preferred by the agency relative to plans preferred by family forest owners.
6. **Environmental Services from Managed Forests (NIPF, Tribal, Public, and Industry):** Landowners are absorbing substantial costs in response to regulatory requirements without recognition of the environmental services that they have and can provide for the benefit of the public. An analysis of the costs absorbed by small owners to produce environmental services (non-market values) will be developed relative to what is known about public valuation of these values as a preparation step for assisting in the development of compensation methods.
7. **Coached Planning for Family Forest Owners' Next Steps:** Extensive training of extension agents to use the landscape management system in order to customize the development of alternative plans for small landowners was started in FY04 and integrated into one region's coached planning activities. This process will be expanded to other regions in the coming year.
8. **Technology Training for Trainers and Early Technology Adopters:** Conduct five additional training classes: LMS 3.0, Advanced LMS, GIS, Fire risk reduction.
9. **Develop and Publish an NIPF LMS User's Handbook.** Considerable progress has been made to simplify the input and output control of the Landscape Management System, resulting in many new users. Some of those trained need simplified user guides to support their use of the technology. Develop a user guide to help small forest landowners utilize LMS in management planning on their woodlands. This handbook will include glossary and other aspects for the NIPF audience.
10. **Demonstration Forest Streaming Video:** Develop two in-field streaming video of the before and after impacts of forest restoration treatments that would be valuable in educating the public on the benefits of practices such as long rotation restoration of old forest functions, riparian buffers that mimic Desired Future Conditions, and treatments that restore eastside forest health with sustainable economics.
11. **Streaming Video Distribution:** Hundreds of streaming video have been developed over the last year for use in extension activities and training. Attention needs to be devoted to how best to distribute streaming video as short courses or demonstrations and in the process prioritize where new streaming video can make the greatest contribution beyond just serving the growing list of requests. Develop a marketing/distribution plan for existing and planned streaming video production.
12. **GIS for the School System:** GIS training in the school system would appear to provide a major opportunity in skill based training that is in high demand. Determine the feasibility and provide support for developing GIS courseware for the school system (high school and community college).

13. **ArcGIS Extensions:** New versions of GIS software have been released that will substantially increase the functionality of GIS. Conversions of existing Extensions to new (advanced/upgraded) GIS software are needed as well as extensions to take advantage of the enhanced functionality.
14. **Support Advisory Committees that are Consistent with RTI's Mission:** Supported advisory committees such as The governor's Forest Health Committee; The Working Forest Forum; and the IUFRO Technology Transfer Conference May 10-13, 2005.
15. **Extend Carbon Links for Broader Geography and More Direct User Control:** Include LMS carbon links for NE/NC and Inland West and internalize the functionality for ease of use by other users in LMS 3.0 downstream releases.
16. **Technology Transfer Communications:** During Jan-Dec 2005 86 presentations were given and 13 training sessions completed. The website received 65,000 non UW unique visitors involving 3.8million hits (from a single page to a complete document).

#### **Examples of RTI Publications**

Briggs, D. and C. L. Mason. 2006. The Future of Wood Products and How This May Affect Small Woodland Owners. Northwest Woodlands. 22(2): pp. 8-11.

Ceder, K. R. and C. L. Mason. 2006. Forest Management Analysis for the City of Bremerton Dept. of Public Works and Utilities. Rural Technology Initiative, College of Forest Resources, University of Washington. 113pp.

Erickson, Ara. Who Owns Washington's Working Forestland? Western Forester. Volume 51, No. 2. Pages 10-12.



**Directed Appropriations to the University of Washington (cont)**  
**FY2000- FY2006 Funding Bills, unless otherwise noted.**

**UW MIDDLE EAST INFORMATION PORTAL**

**FY2005**

Department of State; Education and Cultural Exchange Programs (page 825 of House Report 108-792): “The recommendation includes \$100,000 for each of the following programs: *the Middle East Information Portal*; the Afghanistan Young Leaders Program at the University of Nebraska-Omaha; the Flushing Council on Culture and the Arts’ Partnership Between Queens and Taipei; the Inuit Circumpolar Conference; and the Auschwitz Jewish Center’s Student Scholarship Program.”

**OBJECTIVES/ ACCOMPLISHMENTS**

Under a grant of \$100,000 from the U.S. Department of State, the UW Information (“I”) School has developed a research project called the “Middle East Information Portal.” This grant mandates that there be significant personal contact between scholars from the U.S. and abroad as well as a technical research component. Both the “people-to-people” and the technical research requirements have been rigorously completed.

The portal research is aimed at resolving whether the creation of a single internet site of sources primarily in Arabic (but including Hebrew and Persian) sources for English speakers is feasible. Our focus is the Middle East because the United States has long had important interests, strategic and economic, in the Middle East - from oil to the Suez Canal to its support for Israel. Many of these interests are now at risk.

American interest in Middle East politics increased dramatically after 9/11, but the information available to Americans to judge what was happening did not expand to meet the demand. In large part this was due to language. The Middle East Information Portal project does not solve the problem, but it will provide a “proof-of-concept” pointing the way to solution by accomplishing three important goals:

- Establishing the viability of an Internet portal providing Americans with direct, English-language access to the Arab media;
- Creating links between American and Arab academics studying the media;
- Enabling exchanges between members of the American and Arab media communities.

Under the research project, the I School developed a mock-up of capabilities and content for the Middle East Information Portal. While not a complete and scalable portal system (e.g., with a content-managed back-end, customized processing and streaming capabilities, integrated functionality), the mock-up includes actual representative content and demonstrates selected features of an operational Middle East Information Portal. The selection of content for the Portal is coordinated mutually by the Middle East Center of the Jackson School of International Affairs and the Information School.

*Website*

In July 2006 the current version of the mock up was launched, see:

**<http://cluster.ischool.washington.edu/meip/tiki-index.php>**

Six video programs from the Al Arabiya TV network are uploaded at the Portal featuring various possibilities of the Arabic online-based TV streaming (without translation and with English subtitles/voice-over translation). Additional link to the online TV service (Tvext) providing access to more Arabic videos is given. Links are provided to:

- 1) 19 online TV stations from 14 Middle Eastern countries;
- 2) 12 online radio stations from 8 Middle Eastern countries;
- 3) 32 online newspapers from 15 Middle Eastern countries;
- 4) 16 blogs

### **Defining the Value: Survey of Potential Users**

The Project research team will study the potential use and value of the Middle East Information Portal to American and Middle Eastern audiences through surveys and interviews. The “proof-of-concept,” mock Portal will be demonstrated to and evaluated by the users. Their recommendations for content, features, and design will be collected and analyzed.

A stratified random sample of potential users of the Portal (including college students, academics, and professionals in Washington state) will be given access to the mock-up Portal. The usefulness of the Portal will be assessed by asking open and closed questions in a web-based survey as well as in interview settings. Data will be collected about the nature and scope of content, quality of information sources, the organization of the information, features of the Portal, and its ease of use. Additionally, participants will be asked to provide examples of specific Middle Eastern media sources that they recommend for inclusion in the Portal. Participants will also be asked to share their opinions about the likely impact of the information Portal on the American public’s understanding of the views and sentiments of the Middle East.

Based on the results of the survey we will analyze different perceptions of the Portal by users with different backgrounds. Our approach is to analyze possible future development of the Middle East Information Portal, based on the characteristics of its targeted users. The use of both qualitative and quantitative methods of research will help us to achieve these goals. The numerous anticipated challenges here are connected with our attempt to create a website that will meet the needs of a *multitude* of users with *differing* conditions of Internet access and *different* cognitive abilities, with *variety* of web browsers, monitor resolutions, configuration settings, and connection speeds (especially in the Middle Eastern region).

**Directed Appropriations to the University of Washington (cont)**  
**FY2000- FY2006 Funding Bills, unless otherwise noted.**

**UW ADVANCED MATERIALS RESEARCH**

**FY2005**

Department of Transportation, Federal Aviation Administration (page 1381 of House Report 108-792): "\$500,000 for advanced materials research at the University of Washington."

**FY2006**

Department of Transportation, Federal Aviation Administration (page 146 of House Report 109-307): "\$400,000 is for advanced materials research at the University of Washington."

**OBJECTIVES/ ACCOMPLISHMENTS**

In 2003 the Federal Aviation Administration announced its intention to establish an Air Transportation Center of Excellence devoted to Advanced Materials and solicited proposals from accredited institutions of higher education to establish such a center. The University of Washington, teaming with Washington State University, Oregon State University, and Edmonds Community College, developed and submitted a proposal in response to the FAA solicitation by the 17 November 2003 deadline.

On 13 December 2003, U.S. Secretary of Transportation Norman Y. Mineta announced a 3-year joint award to both the group led by the University of Washington and to a second group led by Wichita State University. This award established the FAA Joint Advanced Materials and Structures (JAMS) Center, managed by Mr. Curt Davies of the W.J. Hughes Tech Center located near Atlantic City, NJ. The UW-led group is known as the Center for Advanced Materials in Transport Aircraft Structures (AMTAS), whereas the WiSU-led group is known as the Center of Excellence for Composites and Advanced Materials (CECAM). According to the announcement, each group is to receive between \$300,000 to \$500,000 annually from the FAA for the duration of the award. Also, each group is required to attract 1:1 matching funds from the private sector.

Although UW is the lead institution for AMTAS, separate financial agreements were established between the FAA and each academic member of AMTAS. For example, if an AMTAS project is proposed and conducted by personnel at Washington State University, then associated FAA funding is awarded directly to WSU. However, the UW is responsible for submitting monthly progress reports and quarterly financial reports for all AMTAS projects to Mr. Davies of the FAA, even for those AMTAS projects not conducted at the UW.

The mission of AMTAS can be summarized as follows:

- To perform research studies;
- To provide educational/training opportunities; and
- To facilitate knowledge transfer between academia, industry, and the FAA.

Further, these activities are all focused on the use of advanced materials in modern commercial transport aircraft.

**ACCOMPLISHMENTS**

Continuously update a detailed AMTAS website describing all center activities  
(<http://depts.washington.edu/amtas/>)

Assemble and submit monthly progress reports and quarterly financial reports to the FAA-JAMS Program Manager Curt Davies.

Organize and administer semi-annual AMTAS meetings involving participants from academia, industry, and governmental agencies.

Participate in (and host, as appropriate) meetings of the Joint Advanced Materials and Structures (JAMS) Center.

Perform the following research studies (publications resulting from these studies summarized in a following bullet):

- Improving Adhesive Bonding of Composites through Surface Characterization (PI: Prof. Brian Flinn, UW)
- Development of Reliability-based Damage Tolerant Structural Design Methodology (PI: Prof. Kuen Lin, UW)
- Combined Global/Local Variability and Uncertainty in Integrated Aeroservoelasticity of Composite Aircraft (PI: Prof. Eli Livne, UW)
- The Effect of Surface Treatment on the Degradation of Composite Adhesives (PI: Prof. Lloyd Smith, WSU)

Develop one short course intended for technicians and engineers currently working in the aerospace industry:

- Course Development: Maintenance of Composite Aircraft (PIs: Charles Seaton and Jerrilee Mosier, EdCC)

Publications resulting from AMTAS projects (this list does not include approximately 65 presentations made by AMTAS personnel at the AMTAS and JAMS meetings listed above)

- Styuart, A. and Lin, K. Y., "A Probabilistic Approach to Damage Tolerance Design of Aircraft Composite Structures", PROCEEDINGS, 47th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, & Materials Conference, 5/1–4/06, Newport, RI
- Styuart, A. and Lin, K. Y., "A Reliability Method for Assessing Damage Severity in Composite Structures", PROCEEDINGS, 2006 SAMPE Int'l Congress, 4/30–5/4/06, Long Beach, CA
- Tuttle, M. E., "**Overview of the Center of Excellence for Advanced Materials in Transport Structures (AMTAS)**", PROCEEDINGS, SAMPE Fall 2005 Technical Conference, 10/31–11/3/05, Seattle, WA
- Phariss, M. K., Flinn, B. D., Ballien, B., Grace, W., and Van Voast, P. J., "**Evaluation of Peel-Ply Materials on Composite Bond Quality**" PROCEEDINGS, SAMPE Fall 2005 Technical Conference, 10/31–11/3/05, Seattle, WA
- Smith, L. and Mahadevan, R., "**Describing Polymer Degradation using Simplified Experimental Measurements**", PROCEEDINGS, SAMPE Fall 2005 Technical Conference, 10/31–11/3/05, Seattle, WA
- Seaton, C., "**Course Development: Maintenance of Composite Aircraft Structures**", PROCEEDINGS, SAMPE Fall 2005 Technical Conference, 10/31–11/3/05, Seattle, WA
- Lin, K. Y., and Huang, Cary, "**A Method for Reliability Assessment of Aircraft Structures Subject to Accidental Damage**", PROCEEDINGS, 46th AIAA/ASME/ASCE/ASC Structures, Structural Dynamics & Materials Conference, 4/18–21/05, Austin, TX

**Directed Appropriations to the University of Washington (cont)**  
**FY2000- FY2006 *Funding Bills, unless otherwise noted.***

**PACIFIC NORTHWEST FREIGHT MOBILITY RESEARCH PROGRAM**

**FY2005**

Department of Transportation, Surface Transportation Research, (page 1388 of House Report 180-792): “\$500,000 for the Pacific Northwest freight mobility research program at Washington State University, the University of Washington, and North Dakota State University.”

**OBJECTIVES/ ACCOMPLISHMENTS**

North Dakota State University, Washington State University, and the University of Washington have developed a joint research and outreach center that focuses on freight mobility for the Northwest region of the United States. This regional approach is vital to solving existing issues and enhancing the future for freight transportation because of the interstate nature of commerce and the inter-jurisdictional issues that arise from it. The mission of the Northern Plains-Pacific Northwest (NORPAC) Regional Freight Mobility Center is to develop a thorough understanding of the dynamics of freight transportation needs/demands of business on a regional basis and to translate that understanding into a more efficient, effective, and secure freight transportation system through university research and outreach.

The broad goals of the Center include:

1. Development of a consistent regional freight transportation database with common data elements among the states within the region.
2. Creation of a cadre of intellectual capital with nationally recognized expertise in freight transportation that can serve as advisors and consultants to both the public and private sector.
3. Develop a regional freight transportation research program that addresses existing freight transportation issues, as well as the future for both private and public sector clientele.
4. Develop an outreach program that works closely with potential users of the research findings to ensure the best application and innovation for improving freight transportation in the region and also assists in identifying existing as well as future issues.

Draft copies of the deliverables for activities 1, 2, 3, and 5 are available for review. Contact: Nancy Nihan at [Nihan@u.washington.edu](mailto:Nihan@u.washington.edu)

**Directed Appropriations to the University of Washington (cont)**  
**FY2000- FY2006 Funding Bills, unless otherwise noted.**

**UW-BOTHELL/CASCADIA SOUTH ACCESS PROJECT**

**FY2005**

Department of Transportation; National Corridor Planning and Border Development; (page 1393 of House Report 108-792): “UW-Bothell/Cascadia South Access Project, Washington ..... \$1,000,000.”

**FY2006**

Department of Transportation (page 174 of H.R.3 SAFETEA-LU): “Intersection project at South Access/522 beginning and ending at the UWB-CCC campus to improve access and alleviate congestion ... \$2,400,000”

**OBJECTIVES/ ACCOMPLISHMENTS**

In 1997, the University of Washington acquired approximately 150 acres of property in Bothell, Washington, and began construction of the UW Bothell campus. By state of Washington legislative directive, the campus was to co-locate the newest community college, Cascadia Community College, with UW Bothell. The state’s Higher Education Master Plan called for these combined higher education institutions to provide access in the fastest growing population region of the state, north King County and Snohomish County, for 10,000 FTE new college students by 2015.

The property had only one city street access point on its north side, and the City of Bothell conditioned long term campus growth upon the construction of an additional campus entrance/access point on the south side of campus. The growth was capped at 3,000 FTE until the South Campus Access Project was completed. Planning for the South Campus Access Project began in 1999, even before the new campus opened in 2000. The South Campus Access Project called for the realignment of two major highway exits from I-405 and State Route 522.

In 2005, the state of Washington Legislature determined the need for higher education access was so intense in this region that UW Bothell was expanded to a four-year campus from its previous status of only serving upper division students. The State Legislature also fully funded, in partnership with the federal government commitment of \$3.4 million (FY 2005 \$1 million, and \$2.37 million in FY 2006), the South Campus Access Project in order to allow the UW Bothell campus to grow to accommodate the increase in students above 3,000 FTE.

In total, the South Campus Access Project is funded at over \$32 million in combination of state and federal funds. Construction begins in Autumn 2006 and will be completed in Autumn 2008. The City of Bothell, in recognition of this funding commitment, has waived the 3,000 FTE limitation immediately, and UW Bothell and Cascadia Community College enrollment will exceed 3,000 FTE this Autumn 2006.

The South Campus Access Project is key to adding further educational opportunity to a community that is in dire need of access to more college places. State predictions expect the need for over 21,000 new college seats just for high school graduates in the next 15 years; 11,000 of those students are in UW Bothell’s service area. This project allows UW Bothell and Cascadia Community College to serve another 7,000 students who will need these local college opportunities.

It will also greatly improve the safety of entrance/exit from two of the busiest highways and one of the most utilized highway intersections in the state of Washington. Further, it will, with improvements planned by the local municipalities, improve mass transit systems.

In summary, the contribution from the federal budget towards the South Campus Access Project will improve highway safety and allow continued growth of educational opportunity in the congested areas of north King County and Snohomish County in the state of Washington. With \$29 million in state contribution to this project and significant planned local commitment in community roads, the federal contribution to the project creates a strong partnership in access, education, safety, mass transit, and highway improvement.

**Directed Appropriations to the University of Washington (cont)**  
**FY2000- FY2006 *Funding Bills, unless otherwise noted.***

**RESEARCH INFRASTRUCTURE- UW APLIED PHYSICS LABORATORY (APL)**

**FY2006**

Department of Defense; Research, Development, Test and Evaluation; Navy (page 383 of House Report 109-359): “Research Infrastructure- University of Washington APL.....\$2,800,000”

**OBJECTIVES/ ACCOMPLISHMENTS**

In the FY 2006 Defense Appropriations bill, Congress appropriated \$2.8M for “Research Infrastructure at APL/UW.” The Department of Defense “taxed” this amount 1%, reducing the appropriation to \$2.772M, which was then sent to the Office of Naval Research (ONR) for administration. ONR further taxed these Congressionally directed funds and sent on \$2.682M to the Naval Sea Systems Command (NAVSEA) to assist APL meet long standing research infrastructure.

APL is a Department of Defense designated University Affiliated Research Center, which conducts advanced research, development, and tests and evaluation (RDT&E) for the Department of Defense (DOD) and Federal Government. Founded in 1943, APL is viewed by DOD as part of the national defense RDT&E infrastructure. The DOD and the Government have assisted APL over six decades with acquiring and replacing aged research infrastructure, including building and research vessels, to further national defense R&D needs.

In coordination with DOD and the Navy, APL/UW will use these funds to obtain research infrastructure space and acquire needed research instrumentation to support the Laboratory’s multidisciplinary research in scientific and engineering disciplines of importance to and for the benefit of the Navy, DOD, and Government. The research infrastructure space will be obtained in close proximity to Henderson Hall (APL’s main research facility), and APL research instrumentation will be acquired as required. The research infrastructure space and research instrumentation for APL will help advance basic and applied research in a wide range of scientific and engineering research and development areas important for maintaining the technological superiority of the U.S. Navy and for U.S. defense needs. The research infrastructure space will support these APL areas and the recently created APL Institute for Applied Research and Training, the APL Photonics and Electronics Center, defense focused Puget Sound programs, and/or other APL departments, centers, or programs.

ONR and NAVSEA have endorsed this appropriation, and both are working with APL/UW to ensure that DOD, Navy, and Government national security objectives are met by use of the appropriation. APL/UW research infrastructure tasking will begin within the next month.



## **Shared Directed Appropriations**

(University of Washington has been a partner and has received funds from these directed appropriations) **FY2000- FY2006 *Funding Bills, unless otherwise noted.***

### **UW-WSU FORESTRY EXTENSION**

#### **FY2001**

Department of Interior, State and Private Forestry (page 158 of House Report 106-914): "This funding includes Senate- proposed allocations of \$900,000 for the University of Washington and Washington State University extension forestry effort."

#### **FY2002**

Department of Interior, State and Private Forestry (page 98 of House Report 107-103/ House Report 107-234): "The Forest Service should follow Senate directions concerning this program"): "The Committee recommends \$9,200,000 for the Pacific Northwest Assistance programs....This funding includes \$900,000 to continue the University of Washington and Washington State University technology transfer extension activities."

#### **FY2003**

Department of Interior, State and Private Forestry (page 1011 of House Report 108-10): "Univ. WA & WA St. U. Extension Forestry .....\$600,000"

#### **FY2004**

Department of Interior, State and Private Forestry, (page 126 of House Report 108-330): "Rural forestry technology, Univ. WA and WA St. U. .... \$625,000"

### **OBJECTIVES/ ACCOMPLISHMENTS**

The Rural Technology Initiative (RTI) was created by a direct request to Congress from rural communities in Washington state to create a pilot project to transfer forest management and forest engineering technology developments to rural forest sector communities. RTI was organized at the University of Washington in partnership with Washington State University and their Cooperative Extension Services. Rural communities had grave concerns that the science being used to justify increased regulations would put them out of business unless they could use technology to justify better solutions. A Rural Advisory Board was established to set priorities and facilitate rural participation. The Board included non-industrial forest owners, rural conservation and economic development district leaders, the Washington Farm Forestry Association, the Forest Training Center, contract loggers, the Hardwoods Commission, woodworkers, tribes, community colleges, USFS, and other community leaders.

Ten projects were initiated from the FY2001 funding and priorities determined for future needs.

- 1. Westside Case Studies on the Impacts of New Riparian Regulations (Highest Advisory Board Priority):** Ten cases studies were completed for the Westside and another ten planned for the Eastside. Results showed large disparities of impacts across owners with some falling well below target rates of return that will motivate land conversions to non-forest uses, an unintended and negative impact on stream protection. The impact of a range of management alternatives allowed under the plan and the degree of mitigation provided by entering into state-sponsored easement programs were quantified. Results were published in Fact Sheets, newsletters, journals, and papers (see attached publications list), and some regulatory refinements were introduced in response to unnecessary costs being forced on landowners.

2. **Eastside Case Studies:** Eastside case studies demonstrated that impacts of the regulations, like on the Westside, were not only costly but precluded thinnings to address forest health problems and reduce fire risks. While thinnings have been shown to reduce risk from insects and fire, the existing research falls short in the ability to determine site carrying capacity so that treatments can be customized for best results. Feasible management plans were developed, and further research on how to customize treatments for site conditions was initiated.
3. **Survey of Consulting Forester and Non-industrial Forest Owner Needs:** A survey of training/education needs showed regulatory interpretation receiving 95% support, riparian protection 85%, tax and estate planning 83%, GIS uses 75%, GPS uses 68%, unstable slopes management 63%, road upgrading and layout 63%, and forest landscape management planning 60%, with the vast majority feeling that new technology can lower costs and more efficiently meet regulatory requirements. The potential to develop a programmatic multi-owner Habitat Conservation Plan in Lewis County as a pilot project also received substantial support. The needs survey was used to plan training sessions and educational demonstrations for the higher priority needs.
4. **Short Course Training and Technical Support:** Landscape Management System (LMS) software to assist in developing forest management plans to meet regulatory requirements more efficiently with better economics was beta tested, and extension agents and trainers trained. Training sessions on using LMS were presented to capacity audiences of consultants, NIPFs, and tribal foresters. Courses on GIS, GPS, uses of the Internet, and road layout were developed and scheduled for 2001, including 23 extension classes featuring the use of RTI technologies during the first 6 months.
5. **Wildlife Habitat and Riparian Function Modeling:** Extensions to the LMS software were developed to model the impact of forest treatments on important riparian functions including shade, potential recruitment of Large Woody Debris (LWD), particulate matter, and habitat suitability for a range of upland species. The models assist in demonstrating both the cost and ecological impact of forest treatments such as thinnings or disturbances. Gaps in bird habitat information were evaluated in order to determine future data needs. These models provided the technology to support several environmentally sensitive pilot projects including the development of a habitat conservation plan for small owners.
6. **Road Upgrade Awareness and Procedures:** In cooperation with several associations and agencies, progress was made on developing a road upgrade awareness booklet. Information was reviewed and made available on the RTI website [www.ruraltech.org](http://www.ruraltech.org) and provided to landowners and consultants attending a series of Department of Natural Resource workshops on road maintenance and upgrades. Software to facilitate road layout was developed and made available on the web.
7. **Economic Cost of Road Upgrade Requirements:** The costs to NIPF landowners to comply with road upgrade requirements were estimated. A Facts Sheet summary of the costs and testimony to the Legislature demonstrated that the costs were very high for marginal benefits and that there was no cash source for owners to use to comply with the requirement. The Legislature subsequently changed the requirements, exempting compliance if financial assistance was not available.
8. **Outreach Education:** Fifteen graduate students received financial support while contributing project support and becoming expert trainers on technology. Quarterly/annual activity reports were published and a Newsletter distributed with all publications and software made available on the website. Twenty professional/educational presentations were made. Demonstration

forest open houses were held to foster a better understanding of riparian management requirements. Forest Products Workers participated in a workshop on changing technology issues. An annual technical review solicited feedback and recommendations for future work.

9. **Log Value Enhancement:** Thinned or pruned forests add value not reflected in the market without credible evidence of early management actions. Electronically readable tree tags were developed to retain value information for future purchasers. An immediate need was to implement a tagging system to certify leave trees in riparian zones to meet easement requirements. Calculators for a conversion factor book were investigated to avoid misuse of complex grading rules that reduce market values.
10. **Harvest Technologies:** New harvest technologies are emerging in response to concerns of damage to leave trees, ground compaction, operator safety, and needed cost efficiencies both in support of riparian fuel reduction treatments to reduce increasing fire risks and stream buffer management. Support for National Forest case studies using new technologies were delayed pending determination of their contracting authority. Demonstrations and evaluations of Scandinavian harvesting equipment and methods were supported.

**Examples of Publications FY 2000:**

**Project Fact Sheets [www.ruraltech.org](http://www.ruraltech.org)**

- Ceder, Kevin. 2001. Using silviculture to sustain wildlife habitat: Assessing changes and trade-offs in forest habitats using a habitat evaluation procedure within the landscape management system. Master's Thesis. College of Forest Resources, University of Washington.
- Mason, Larry. 2001. The Rural Technology Initiative: Computer Technology for Tomorrow's Forests Today. Northwest Woodlands, Portland OR. Fall 2001, Vol. 17, No. 4. pp 20-21.

## **Shared Directed Appropriations (cont)**

(University of Washington has been a partner and has received funds from these directed appropriations) **FY2000- FY2006 *Funding Bills, unless otherwise noted.***

### **CENTER FOR DESIGN OF ANALOG-DIGITAL INTEGRATED CIRCUITS**

**FY2002**

**Department of Defense, “To Develop Analog and ‘mixed signal’ electronics for space vehicles.”**

#### **SUMMARY**

These funds (*in actuality a total of \$258,300*) were allocated to the UW Center for Design of Analog-Digital Integrated Circuits (CDADIC) for a three-year program that was completed in 2005. The project was administered out of the AFRL space vehicles directorate in Albuquerque, NM. This allocation was part of a larger \$1.1M appropriation to Washington State University CDADIC which was distributed as subcontracts to four universities and two industries. Work supported is shown below in the Annual Report submitted by Bruce Darling, UW PI and member of CDADIC.

#### **PROJECT DESCRIPTION**

This project shall methodically develop improved device models for Honeywell’s MOI5 SOI CMOS process over a much wider temperature range of  $-65^{\circ}\text{C}$  to  $+200^{\circ}\text{C}$  and will include the effects of transient ionizing radiation on these device characteristics. Current SPICE MOSFET models for circuit design are inaccurate over the wider temperature range of space applications and do not address radiation effects. The BSIM3SOI SPICE model will be extended to include the effects of wider operating temperatures and ionizing radiation, making this model suitable for the simulation of circuits in space environment applications.

#### **RESEARCH RESULTS**

Fundamental physics calculations have been used to predict the temperature dependence of partially-depleted SOI MOSFETs over a wider temperature range of  $-65^{\circ}\text{C}$  to  $+200^{\circ}\text{C}$  and with steady-state and transient photocurrents arising from radiation-induced electron-hole-pair generation within the bulk regions of the device. The native C-code for the public-domain Berkeley BSIM3SOI MOSFET model has been modified to include these temperature and radiation effects. The resulting device characteristics have been validated against data found in the published literature, and the agreement appears satisfactory for these models to be used in circuit and system simulations.

#### **MILESTONES**

Develop electron and hole mobility model for temperature range of  $-65^{\circ}\text{C}$  to  $+200^{\circ}\text{C}$ .  
Develop BSIMSOI MOSFET model to include wider temperature range.  
Collect temperature dependent device data.  
Validate model against results of wide temperature cycling.  
Analyze SOI MOSFET structure for ionizing radiation photocurrents.  
Develop BSIMSOI MOSFET model to include radiation induced current sources.  
Collect radiation dependent device data.  
Validate model against results of steady-state and pulsed radiation conditions.